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WASTEWATER CHARACTERIZATION SURVEY, MOUNTAIN HOME AIR FORCE BASE, IDAHO

ARMSTRONG LABORATORY

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Final Technical Report for Period 1-12 June 1992

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BROOKS AIR FORCE BASE, TEXAS

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13. ABSTRACT *(Maximum 200 words)*

Personnel from Armstrong Laboratory Water Quality Function conducted a wastewater characterization survey at Mountain Home AFB ID from 1 to 12 Jun 92. The scope of the survey was to sample the influent to the sewage lagoons. The sample results will be used by HQ ACC/DESU for the design of a new wastewater treatment plant at Mountain Home AFB. Significant findings were: the wastewater concentration will change due to the mission change after the survey; pump curves should be developed for the lagoon pump station pumps; overall, the wastewater seems to meet most criteria of a medium concentration domestic waste; the CE pump station should be cleaned out regularly; and backup pumps should be installed in the CE pump station.

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TABLE OF CONTENTS

FIGURES

TABLES

ACKNOWLEDGMENTS

I greatly appreciate the technical expertise and hard work provided by the other members of the survey team: Capt Richard "Dick" P. McCoy and 1Lt Steven A. Svejda.

I would also like to thank all the personnel in the Bioenvironmental Engineering Services (BES) for their assistance in the accomplishment of this survey.

WASTEWATER CHARACTERIZATION SURVEY, MOUNTAIN HOME AIR FORCE BASE, IDAHO

INTRODUCTION

A wastewater characterization survey was conducted at Mountain Home Air Force Base (AFB), Idaho, from 1-12 June 1992 by personnel from Armstrong Laboratory (AL) located at Brooks AFB, Texas. Influent samples to the sewage lagoons were collected and analyzed for various parameters. The sample results will be used by Headquarters Air Combat Command (HQ ACC) Civil Engineering Technical Service Office (CETSO) for the design of a new wastewater treatment plant (WWTP) at Mountain Home AFB. Specific sampling sites around base were also sampled for various parameters. These sample results were intended for use by Mountain Home AFB personnel to identify toxic discharges they may have in the wastewater collection system.

The survey was performed in response to a request from Headquarters Tactical Air Command (TAC now ACC) Bioenvironmental Engineer to perform a characterization study to support the Architect and Engineer (A & E) design of a WWTP. Armstrong Laboratory personnel that performed the survey included Capt Darrin L. Curtis (Project Engineer), Capt Richard P. McCoy, and 1st Lt Steven A. Svejda.

DISCUSSION

Background

Mountain Home AFB is located 50 miles southeast of Boise in the southwestern portion of Idaho. A semiarid climate prevails in southern Idaho. Summer highs at the base average 87 °F. Rain is scarce during the summer and snowfall averages 12 inches per year. The area experiences about 245 days of sunshine each year. Although nearby mountains experience harsh seasonal variations, the weather at the base is surprisingly mild. The base experiences four distinct seasons.

The 366th Wing, known as "The Gunfighters," is located at Mountain Home. Its mission is to provide a composite air intervention force, deliver combat airpower rapidly, anytime, anywhere.

To support the mission, several industrial facilities are located at the base. These facilities include aircraft and vehicle washracks, corrosion control, equipment maintenance, photo, and x-ray.

The existing wastewater facilities at Mountain Home AFB include a number of oil/water separators, a combined industrial and domestic sewage collection system, several lift stations, sewage lagoons, and infiltration ponds. Very little information was available on the composition of the wastewater generated at Mountain Home AFB.

Therefore, AL was called upon to provide a characterization of the wastewater generated.

Permit Standards

The existing lagoons discharge to infiltration ponds and no current permit is needed. A permit will be needed for the discharge of water from the proposed WWTP.

Sampling Strategy

A presurvey was conducted at Mountain Home AFB from 21-22 April 1992. During this presurvey, the sampling protocol that had been developed by Capt Curtis was reviewed by the Base Bioenvironmental Engineer (BEE). All parties concurred with the sampling strategy, which included sampling the influent to the sewage lagoons and two pump stations.

Sampling Methods

Wastewater samples were typically collected over a 24-hour period as a time-proportional composite (i.e., a composite of 24 samples collected at 1-hour intervals). The automated composite sampler contains a 3-gallon glass jar which was packed in ice before each day of sampling. Samples collected for volatile organics, oils and greases, and total petroleum hydrocarbons were collected as grab samples. Any unusual characteristics (odor, color, etc.) of the samples were noted.

Samples were placed in iced coolers and transported back to the workcenter, Bldg 2322, for preservation and/or refrigeration until shipment to the Armstrong Laboratory Analytical Services Division at Brooks AFB TX. Sample preservation was in accordance with the *AFOEHL Recommended Sampling Procedures, March 1989*, commonly referred to as the "AFOEHL Sampling Guide."

Table 1 shows group, type, containers, and preservation for each parameter. If a sample was collected differently from this procedure, it is noted in the comments section under each site. For some samples, low flow resulted in part of a sample being a grab because of the limited volume.

RESULTS

Results of all the data collected during the survey, except Environmental Protection Agency (EPA) method 601/602, are located in Appendix A. Appendix B has the EPA 601/602 data. Biochemical Oxygen Demand (BOD-5) data are located in Appendix C.

BOD-5

BOD-5 analysis was performed as stated in *Standard Methods for the Examination of Water and Wastewater*. These samples were run in the Mountain Home Bioenvironmental Engineering Services (BES) laboratory by AL personnel.

Table 1. Parameters, Group, Type, Containers, and Preservation

PARAMETER NAME	TYPE	CONTAINER	PRESERVATION
GROUP A (other than O & G) Chemical Oxygen Demand Kjeldahl Nitrogen Organic Carbon Phosphorus, Total	**Composite**	Plastic	Cool to 4° C & H_2SO_4 to pH<2
GROUP A (O & G) Oil & Grease Total Petroleum Hydrocarbons	**Grab**	Glass	Cool to 4° C & H_2SO_4 to pH<2
GROUP E Phenols	**Composite**	Glass	Cool to 4° C & H_2SO_4 to pH<2
GROUP F Metals	**Composite**	Plastic	HNO_3 to pH<2
Group G Alkalinity Chloride Specific Conductance Surfactant-MBAS Solids	**Composite**	Plastic	Cool to 4° C
EPA 601/601	**Grab**	40 ml Vial	Cool to 4° C

Quality Assurance/Quality Control (QA/QC)

Field Quality Assurance/Quality Control

A field QA/QC program was used during this survey to verify the accuracy and reproducibility of laboratory results. Errors in the reporting of analytical data can result from many causes, including equipment malfunctions and operator error, both during the sampling and analysis. Sample contamination is a common error and may result from residue in sampling containers, preservation, handling, storage, or transport to the laboratory. Appendix D contains the QA/QC data.

Reagent blanks are aliquots of distilled water that are as free of contaminants as possible and contain all the reagents in the same proportion as used in the processing of the samples. The reagent blank is used to correct for possible contamination resulting from the preparation or processing of the sample. All contaminants analyzed from the reagent blanks should be nondetected.

Spike samples are aliquots of distilled water in which a known quantity of contaminant is added. Spikes serve as a check of the confidence of the data, through the recovery of known additions. Spike samples were prepared on-site using WasteWatR™ Quality Control Standards shown in Appendix E.

Internal QA/QC

The Armstrong Laboratory Analytical Services Division Quality Assurance Plan establishes the guidelines and rules necessary to meet the analytical laboratory requirements of 43 states, U.S. Environmental Protection Agency, and private accrediting agencies. Specific activities include inserting a minimum of one blind sample control for each parameter analyzed on a monthly basis and periodic auditing of the laboratory quality assurance items from each branch. All instruments are calibrated each day of use and at least one National Institute Standards and Technology/Standard Reference Materials (NIST/SRM) traceable standard and control sample is included with each analytical run. Corrective action is documented every time a quality assurance parameter is not met, and all sample data have established detection limits. The laboratory participates in numerous proficiency surveys and interlaboratory quality evaluation programs, and all quality control samples are plotted and tracked by the individual work sections.

Sampling Sites

Lagoon

The sampler was located at Bldg 3505 (Figure 1 and Appendix F). Samples were collected as 24-hour composite samples between 4-11 Jun 92.

Comments: 4 Jun 92, start at 1015, 3 Jun 92, samples were grab
6 and 7 Jun 92, low flow
8 Jun 92, pump at CE lift station broke. Only one small 3 in. pump was pumping; samples were grab.

Lagoon #

These samples were collected as 8-hour composite samples. The "#" sign represents the number of the sample. Table 2 has the time and date each sample was collected along with BOD-5 results. Sample location is the same as Lagoon.

Lagoon 1 and 2, Grabs
Lagoon 8, Group E was grab

Table 2. Lagoon # Composite Sampling Times

Sample	Time	BOD-5 mg/L
Lagoon 1	Grab-0845, 4 Jun 92	199
Lagoon 2	0845-1450, 4 Jun 92	166
Lagoon 3	1450-2050, 4 Jun 92	164
Lagoon 4	2050-0850, 5 Jun 92	156
Lagoon 5	0850-1500, 5 Jun 92	203
Lagoon 6	1500-2050, 5 Jun 92	163
Lagoon 7	2050-0835, 6 Jun 92	124
Lagoon 8	0800-1515, 8 Jun 92	101

Figure 1. Lagoon and Lagoon # Site Location.

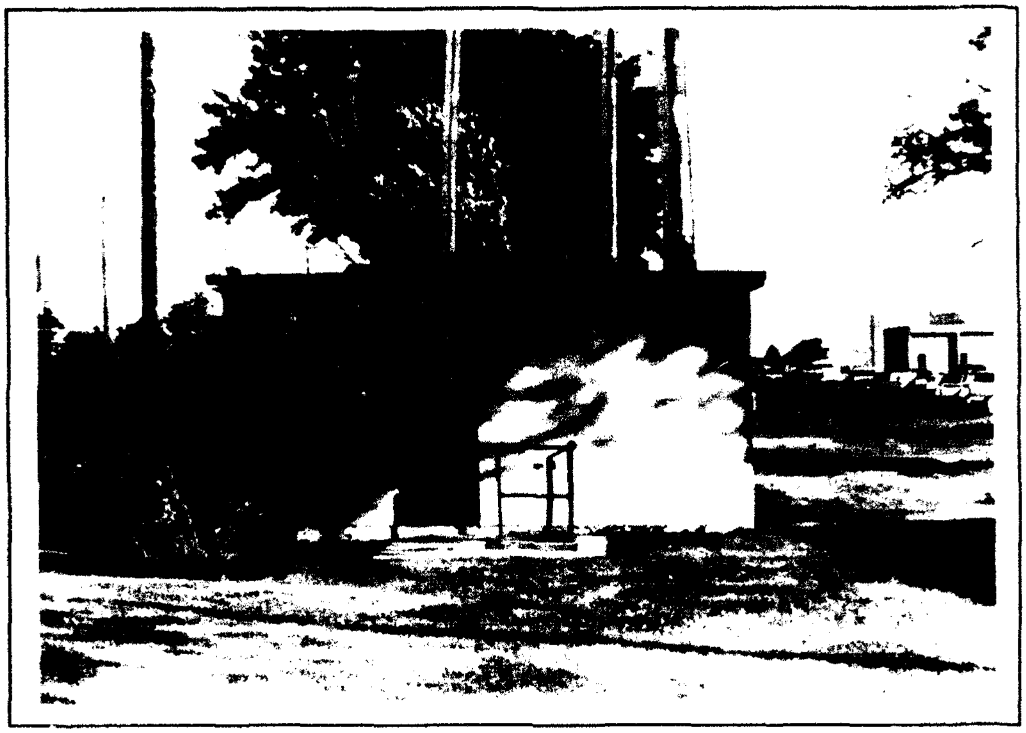

Figure 2. Building 1312, Civil Engineering Pump Station.

CE Pump

Building 1312: This site is located north of the intersection of E Street and 19th Avenue (Figure 2 and Appendix F). Samples were collected on the 4th, 5th, and 9th of Jun 92.

Comments: 4 Jun 92, sampling started at 1345, 3 Jun 92. Had to punch through a hard crust 6 in. thick of grease and other solid material.

Motel Pump

Structure 2707: This site is located across from billeting (Figure 3 and Appendix F). Samples were collected on the 4th, 5th, and 9th of Jun 92.

Comments: 4 Jun 92, sample started at 0930, 3 Jun 92.

Propulsion

Building 1225: This sample was collected at the outfall of the oil/water separator located on the northwe~t side of the building (Appendix F). The sample was collected at 1015, 10 Jun 92.

Figure 3. Structure 2707, Motel Pump Station Location.

Discussion of Results

Selected data will be brie^ly discussed by site in this section. Only values that were noted as being above typical levels will be cited. Table 3 has concentration values for various parameters of typical domestic wastewater. It should be noted that Mountain Home's wastewater is influenced by some industrial wastes.

Lagoon

Biochemical Oxygen Demand samples were collected for sites Lagoon and Lagoon #. The results for all BOD-5 samples are located in Appendix C. Samples averaged 160 mg/L for BOD-5 on two workdays and 112 mg/L on two weekend days. These levels conclude that the waste is weak on nonworkdays and between weak and medium on workdays, for BOD-5.

The solids data from the Lagoon site show that the observed concentrations constitute a medium domestic waste when compared to Table 3. Settleable solids data as seen in Table 4 are representative of a typical medium domestic waste. Chemical Oxygen Demand (COD) and Total Organic Carbon (TOC) values indicate a very weak domestic waste. Ammonia and phosphorus indicate a weak to medium waste. Chlorides and alkalinity indicate a strong domestic waste. Alkalinity and chlorides may be influenced by the potable water supply. Oil & grease samples indicate a weak domestic waste.

Table 3. Typical Composition of Untreated Domestic Wastewater (After Metcalf & Eddy, 1979(5))
(All values except settleable solids are expressed in mg/L)[a]

Constituent	Concentration Strong	Medium	Weak
Solids, total:	1200	720	350
Dissolved, total	850	500	250
Fixed	525	300	145
Volatile	325	200	105
Suspended, total	350	220	100
Fixed	75	55	20
Volatile	275	165	80
Settleable solids, ml/L	20	10	5
Biochemical oxygen demand, 5-day,20°C	400	220	110
Total organic carbon (TOC)	290	160	80
Chemical oxygen demand (COD)	1000	500	250
Nitrogen (total as N):	85	40	20
Organic	35	15	8
Free ammonia	50	25	12
Nitrites	0	0	0
Nitrates	0	0	0
Phosphorus (total as P):	15	8	4
Organic	5	3	1
Inorganic	10	5	3
Chlorides[b]	100	50	30
Alkalinity (as $CaCO_3$)[b]	200	100	50
Grease	150	100	50

[a] mg/L=g/m^3.
[b] Values should be increased by amount in domestic water supply.
Note: 1.8(°C) + 32 = °F

Only three metal samples are discussed for this site. The first sample was the lead concentration of 28 µg/L on 11 Jun 92. This sample is only 8 µg/L above the detection limit and should not pose a problem because it was found only one day. The next two samples had silver readings of 28 µg/L and 12 µg/L of silver.

Small amounts of chloroform, 1,4-Dichlorobenzene, methylene chloride, ethyl benzene, toluene, and benzene were found at this location. The largest concentration was 6.2 µg/L of toluene on 7 Jun 92.

Lagoon #

The composition of the influent broken up by time of day mirrors the results for the day-long samples collected at site Lagoon, although no silver or lead was found in these samples. A reading of 41 µg/L of toluene was recorded on 8 Jun 92.

CE Pump

The CE Pump station results will not represent typical waste on the base due to the large crust on the top of the waste in the wet well that had to be punctured to gain

Table 4. Settleable Solids "Grab Samples" Concentrations at Site Location Lagoon

Date	Time	Concentration (ml/L)
08 Jun 92	0800	1
08 Jun 92	1520	25
09 Jun 92	0845	5
09 Jun 92	0925	9
10 Jun 92	0835	11
10 Jun 92	1035	9
10 Jun 92	1305	8
10 Jun 92	1405	8

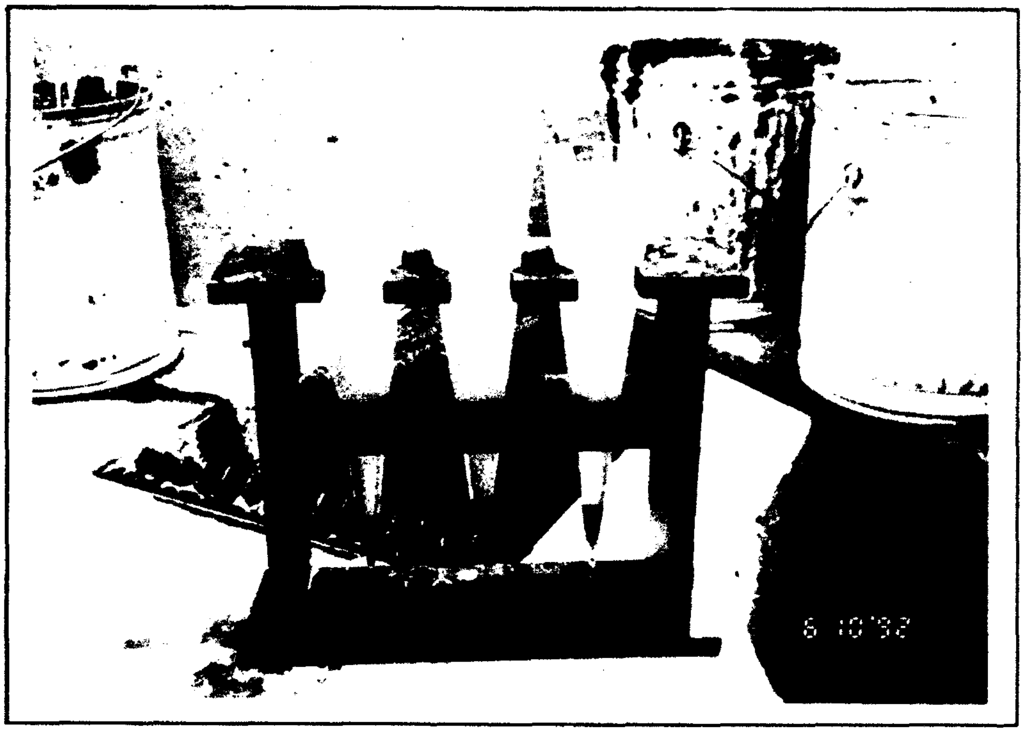

Figure 4. Example of a Settleable Solids Sample at Site Lagoon.

access to the liquid waste. The pumps also stopped pumping at this site and sewerage was backed up in the distribution system. The results may only be used for general reference values.

Motel Pump

This site had a reading of 59 µg/L of silver on 9 Jun 92. This sight contains mostly housing waste and should not contain this much silver. A review of the upstream discharges should be made. Chloroform and toluene were also found at this site in low concentrations.

Figure 5. A member of the AL team reading Settleable Solids.

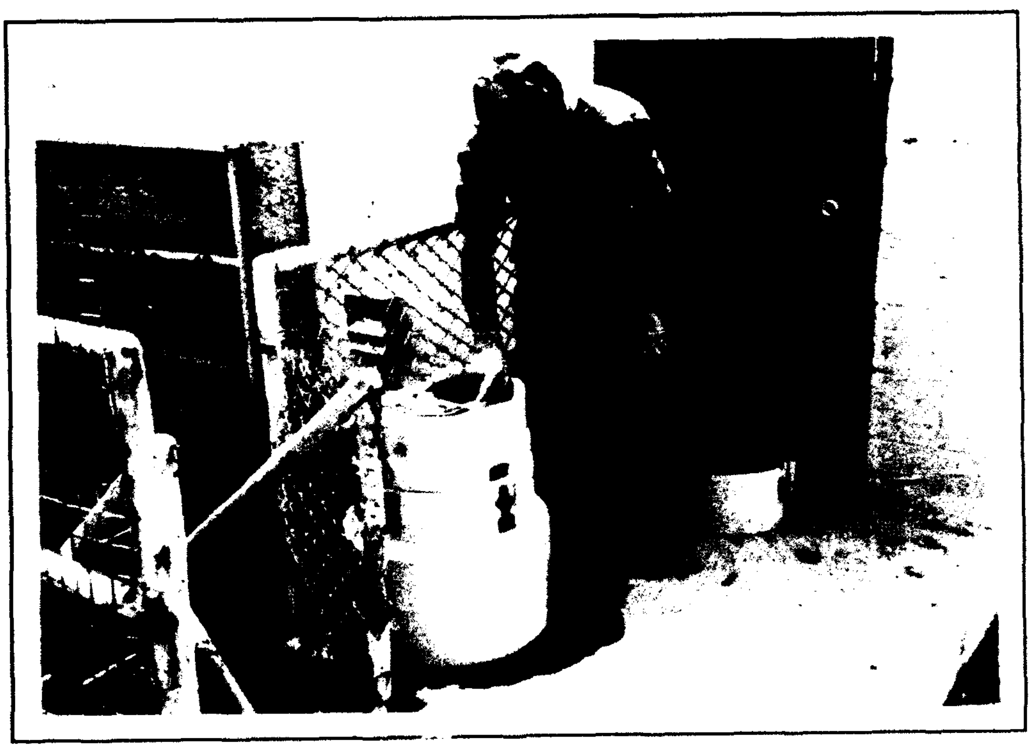

Figure 6. A member of the AL team setting up a Sigma sampler.

Propulsion

All parameters are high due to the nature of the shop. These results cannot be correlated with the typical domestic wastewater table because this is industrial waste with no domestic influence.

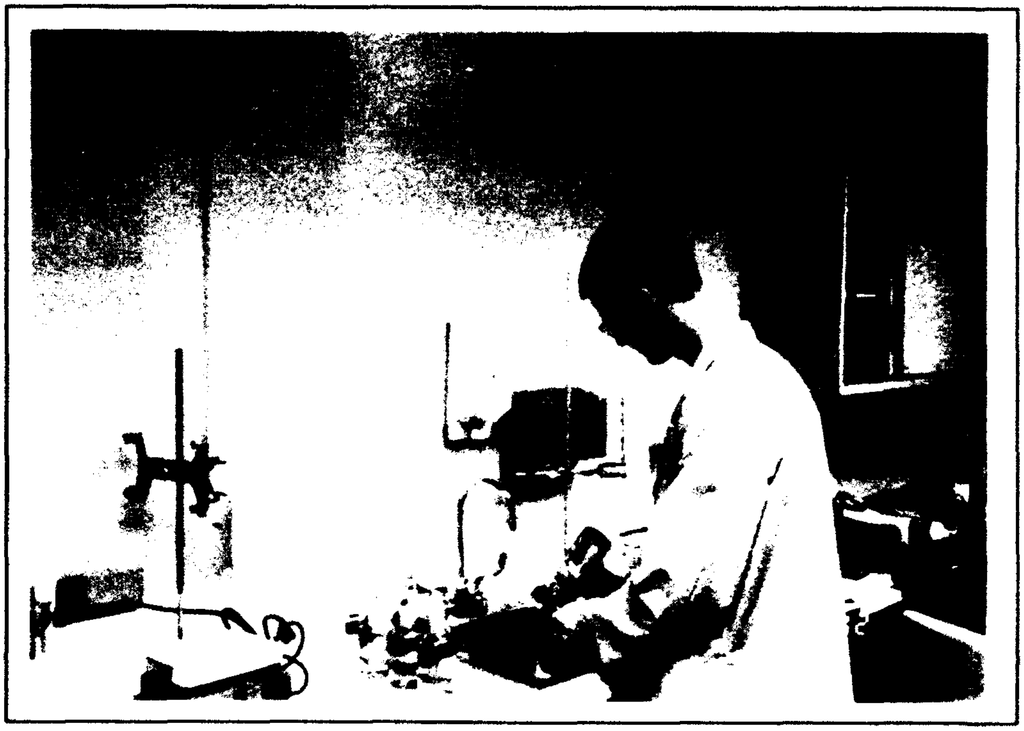

Figure 7. A member of the AL team preparing BOD-5 samples.

Discussion of Flow

No flow data was taken, but pump running times are located in Appendix G. This data could be used to calculate flow if pump curves were used against the numbers that were taken during the survey. From that information mass concentrations could be calculated.

RECOMMENDATIONS AND CONCLUSIONS

Wastewater Characterization

The concentration of the wastewater should be adjusted for the larger population that will be necessary to support the new mission at Mountain Home AFB. During the survey the base was still in transition to the 366th "Composite" Wing. Therefore, the wastewater characteristics could change with the new mission.

Flow

Pump curves should be produced for the Lagoon pumps to determine the actual flow of the wastewater. This is a critical factor when designing a WWTP. Pump running times were taken during the survey and may be used to determine flow once pump curves are determined.

Waste Characteristics

Overall, the wastewater seems to meet most criteria of a medium concentration domestic waste. The limited industrial influences detected may indicate that proper shop practices and housekeeping are being conducted. Apparently, shop personnel were interested in doing their best to minimize industrial influence to the sanitary sewer.

CE Pump

The CE Pump station should be cleaned out regularly or when a thick coating forms on the surface of the wet well. This scum layer is due to grease buildup. The grease is most likely coming from domestic sources and not industrial sources. It may be a good idea to inform base housing and dining facility personnel that no grease should be poured down the drain. During the survey, a 6-in. thick crust was observed on top of the wastewater in the wet well. Also, reserve pumps should be installed to ensure proper operation. During the survey, the pumps stopped pumping and wastewater backed up into the distribution system. This backup could lead to possible sanitation and health problems. The pump problem at building 1312 should be investigated.

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Appendix A

All Data Except 601/602

Table A-1. Lagoon Results Except 601/602
Lagoon 24-hour results
Mountain Home AFB Wastewater Characterization Survey
1-12 June

			CN921200	CN921214	CN921226	CN921228	CN921230	CN921234	CN921238	GN921244
			Lagoon	Lagoon	Lagoon	Lagoon	Lagoon	Lagoon	Lagoon	Lagoon
Analyte	Units	Method	04-Jun-92	05-Jun-92	06-Jun-92	07-Jun-92	08-Jun-92	09-Jun-92	10-Jun-92	11-Jun-92
pH			6.2	6.4	6.4	6.4	6.4	6.2	6.3	6.3
Biochemical Oxygen Demand	mg/l			168	151	109	114			
Temperature	°C		21	20	21	21	20	21	21	21
Chemical Oxygen Demand	mg/L	STD METH 508	82	130	285	150	130	260	215	305
Kjeldahl Nitrogen	mg/L	EPA 351.2	18.5	22	23.5	23	23	25	26	32
Oil & Grease	mg/L	EPA 413	59.5			14.8	14.4	36.5	32	50.8
Total Organic Carbon	mg/L	EPA 415.1	26	48	39	34	34	40	54	86
Phosphorus, Total	mg/L	EPA 365.1	4.6	5.4	6	5.5	6	5.3	6.7	7.1
Total Petroleum Hydrocarbons	mg/L	EPA 418.1	6.6			<1	3.8	5.8	3.4	12.8
Ammonia		EPA 350.1		19.2	21.4	18.6	18			
Phenols	µg/L	EPA 420.2	10	27	37	38	46	37	30	26
Arsenic	µg/L	EPA 206.2	<10	16	19	17	22	<10	<10	<10
Barium	µg/L	EPA 200.7	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium	µg/L	EPA 210.1	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium	µg/L	EPA 213.2	<5	<5	<5	<5	<5	<5	<5	<5
Calcium	mg/L	EPA 215.1	59.3	76	70	92	90	78	72	71
Chromium, Total	µg/L	EPA 218.1	<50	<50	<50	<50	<50	<50	<50	<50
Copper	µg/L	EPA 220.1	<50	<50	<50	<50	<50	<50	<50	<50
Iron	µg/L	EPA 236.1	317	360	440	210	280	560	360	440
Lead	µg/L	EPA 239.2	<20	<20	<20	<20	<20	<20	<20	28
Magnesium	mg/L	EPA 242.1	18	19	17	23	21	19	18	18
Manganese	µg/L	EPA 243.1	<50	<50	<50	<50	<50	<50	<50	<50
Mercury	µg/L	EPA 245.1	<1	<1		<1	<1	<1	<1	<1
Nickel	µg/L	EPA 249.1	<50	<50	<50	<50	<50	<50	<50	<50
Silver	µg/L	EPA 272.2	<5	<5	<5	<5	<5	<5	28	12
Zinc	µg/L	EPA 200.7	<50	80	90	50	50	106	106	145
Alkalinity (total)	mg/L	EPA 310.2			273	236	250			
Alkalinity, bicarbonate	mg/L	EPA 310.1			273	236	250			
Chloride	mg/L	EPA 325.2			65	83	80			
Residue, Total	mg/L	EPA 160.3	584		622	694	713	815	691	947
Residue, Filterable	mg/L	EPA 160.1	474		508	630	588	530	520	452
Residue, Nonfilterable	mg/L	EPA 160.2	90		155	110	155	200	80	272
Residue, Volatile	mg/L	EPA 160.4	184		183	158	172	300	225	495
Specific Conductance	µmhos	EPA 120.1	878		878	1028	1003	945	939	940
Surfactants-MBAS	mg/L	EPA 425.1	0.2		0.5	0.2	0.3	0.2	0.2	0.3

Note: Blank cells indicate no sample was analyzed for that specific analyte

Table A-2. Lagoon # Results Except 601/602

Lagoon # 6-8 hour results

Mountain Home AFB Wastewater Characterization Survey

1-12 June

			CN921206	CN921208	CN921210	CN921212	CN921220	CN921222	CN921224	CN921232
			Lagoon 1	Lagoon 2	Lagoon 3	Lagoon 4	Lagoon 5	Lagoon 6	Lagoon 7	Lagoon 8
Analyte	Units	Method	04-Jun-92	04-Jun-92	04-Jun-92	04-Jun-92	05-Jun-92	05-Jun-92	06-Jun-92	08-Jun-92
pH			6.2	6.4	6.4	6.4	6.4	6.4	6	6.3
Biochemical Oxygen Demand	mg/l		199	166	164	156	203	163	124	101
Temperature	°C		21	22	21	20	22	21	20	22
Chemical Oxygen Demand	mg/L	STD METH 508	48	288	275	163	230	135	140	215
Kjeldahl Nitrogen	mg/L	EPA 351.2	20.5	22.5	23	20.5	28	23.5	23	24.5
Oil & Grease	mg/L	EPA 413	49.6	69.6	64	64	76.8	76.8	35.2	144
Total Organic Carbon	mg/L	EPA 415.1	21	48	62	36	45	39	38	32
Phosphorus, Total	mg/L	EPA 365.1	3.3	5.8	6.2	5.4	7.6	6.2	5.8	4.7
Total Petroleum Hydrocarbons	mg/L	EPA 418.1	5.9	11.2	6.4	2.6	5.3	6.4	25.9	19.2
Ammonia		EPA 350.1					26.6	21	13	
Phenols	µg/L	EPA 420.2	15	33	44	44	50	40	48	68
Arsenic	µg/L	EPA 206.2	14	18	18	17	<10	<10	11	19
Barium	µg/L	EPA 200.7	<100	<100	<100	<100	<100	110	<100	<100
Beryllium	µg/L	EPA 210.1	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium	µg/L	EPA 213.2	<5	<5	<5	<5	<5	<5	<5	<5
Calcium	mg/L	EPA 215.1	69	77	77	72.1	70	69	68	93
Chromium, Total	µg/L	EPA 218.1	<50	<50	<50	<50	<50	<50	<50	<50
Copper	µg/L	EPA 220.1	<50	<50	<50	<50	<50	<50	<50	<50
Iron	µg/L	EPA 236.1	440	360	410	250	520	340	260	270
Lead	µg/L	EPA 239.2	<20	<20	<20	<20	<20	<20	<20	<20
Magnesium	mg/L	EPA 242.1	17	19	20	18	17	17	17	22
Manganese	µg/L	EPA 243.1	<50	<50	<50	<50	<50	<50	<50	<50
Mercury	µg/L	EPA 245.1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	µg/L	EPA 249.1	<50	<50	<50	<50	<50	<50	<50	<50
Silver	µg/L	EPA 272.2	<5	<5	<5	<5	<5	<5	<5	<5
Zinc	µg/L	EPA 200.7	60	80	70	70	110	70	60	77
Alkalinity (total)	mg/L	EPA 310.2					271	271	213	
Alkalinity, bicarbonate	mg/L	EPA 310.1					271	271	213	
Chloride	mg/L	EPA 325.2					65	68	63	
Residue, Total	mg/L	EPA 160.3	643	747	674	673	710	643	543	776
Residue, Filterable	mg/L	EPA 160.1	468	506	502	514	520	558	508	602
Residue, Nonfilterable	mg/L	EPA 160.2	158	170	160	145	260	145	70	252
Residue, Volatile	mg/L	EPA 160.4	210	255	227	218	265	189	132	197
Specific Conductance	µmhos	EPA 120.1	908	972	892	858	952	899	843	1065
Surfactants-MBAS	mg/L	EPA 425.1	0.2	0.5	0.6	0.3	0.2	0.5	0.1	0.1

Note: Blank cells indicate no sample was analyzed for that specific analyte

Table A-3. CE Pump Results Except 601/602 CE Pump Station Results Mountain Home AFB Wastewater Characterization Survey 1-12 June					
			GN921202	CN921216	CN921240
			CE Pump	CE Pump	CE Pump
Analyte	Units	Method	04-Jun-92	05-Jun-92	10-Jun-92
pH			6.4	6.5	6.3
Temperature	°C		21	21	21
Chemical Oxygen Demand	mg/L	STD METH 508C	640	220	300
Kjeldahl Nitrogen	mg/L	EPA 351.2	34	25	34
Oil & Grease	mg/L	EPA 413	1110	168	192
Total Organic Carbon	mg/L	EPA 415.1	228	67	74
Phosphorus, Total	mg/L	EPA 365.1	13.8	5.6	10.6
Total Petroleum Hydrocarbons	mg/L	EPA 418.1	74	15	192
Phenols	µg/L	EPA 420.2	73	37	52
Arsenic	µg/L	EPA 206.2	21	17	<10
Barium	µg/L	EPA 200.7	150	<100	<100
Beryllium	µg/L	EPA 210.1	<10	<10	<10
Cadmium	µg/L	EPA 213.2	<5	<5	<5
Calcium	mg/L	EPA 215.1	75.2	57	56
Chromium, Total	µg/L	EPA 218.1	<50	<50	<50
Copper	µg/L	EPA 220.1	58	<50	<50
Iron	µg/L	EPA 236.1	3400	1200	950
Lead	µg/L	EPA 239.2	<20	<20	<20
Magnesium	mg/L	EPA 242.1	19.34	15	14
Manganese	µg/L	EPA 243.1	101	<50	<50
Mercury	µg/L	EPA 245.1	<1	<1	<1
Nickel	µg/L	EPA 249.1	<50	<50	<50
Silver	µg/L	EPA 272.2	5	<5	19
Zinc	µg/L	EPA 200.7	500	200	250
Residue, Total	mg/L	EPA 160.3	2039	798	951
Residue, Filterable	mg/L	EPA 160.1	630	414	416
Residue, Nonfilterable	mg/L	EPA 160.2	190	270	328
Residue, Volatile	mg/L	EPA 160.4	1475	403	526
Specific Conductance	µmhos	EPA 120.1	976	783	791
Surfactants-MBAS	mg/L	EPA 425.1	1.5	2.5	5.2

Table A-4. Motel Pump Results Except 601/602
Motel Pump Station Results
Mountain Home AFB Wastewater Characterization Survey
1-12 June

			GN921204	CN921218	CN921236
			Motel	Motel	Motel
Analyte	Units	Method	04-Jun-92	05-Jun-92	09-Jun-92
pH			6.7	6.6	6.4
Temperature	°C		21	21	21
Chemical Oxygen Demand	mg/L	STD METH 508C	100	205	225
Kjeldahl Nitrogen	mg/L	EPA 351.2	23.5	22	26
Oil & Grease	mg/L	EPA 413	118.4	63.2	55.7
Total Organic Carbon	mg/L	EPA 415.1	40	50	50
Phosphorus, Total	mg/L	EPA 365.1	7.6	9.4	8.3
Total Petroleum Hydrocarbons	mg/L	EPA 418.1	8	4.6	20.5
Phenols	µg/L	EPA 420.2	63	55	50
Arsenic	µg/L	EPA 206.2	20	17	<10
Barium	µg/L	EPA 200.7	<100	<100	<100
Beryllium	µg/L	EPA 210.1	<10	<10	<10
Cadmium	µg/L	EPA 213.2	<5	<5	<5
Calcium	mg/L	EPA 215.1	67	63	65
Chromium, Total	µg/L	EPA 218.1	<50	<50	<50
Copper	µg/L	EPA 220.1	<50	<50	<50
Iron	µg/L	EPA 236.1	400	100	380
Lead	µg/L	EPA 239.2	<20	<20	<20
Magnesium	mg/L	EPA 242.1	17	16	18
Manganese	µg/L	EPA 243.1	<50	<50	<50
Mercury	µg/L	EPA 245.1	<1	<1	<1
Nickel	µg/L	EPA 249.1	<50	<50	<50
Silver	µg/L	EPA 272.2	<5	<5	59
Zinc	µg/L	EPA 200.7	110	<50	122
Residue, Total	mg/L	EPA 160.3	739	731	655
Residue, Filterable	mg/L	EPA 160.1	486	514	510
Residue, Nonfilterable	mg/L	EPA 160.2	225	220	8
Residue, Volatile	mg/L	EPA 160.4	282	260	206
Specific Conductance	µmhos	EPA 120.1	931	900	914
Surfactants-MBAS	mg/L	EPA 425.1	0.5	2.7	0.2

Table A-5. Propulsion Results Except 601/602
Propulsion Results
Mountain Home AFB Wastewater Characterization Survey
1-12 June

			GN921242
			Propulsion
Analyte	Units	Method	10-Jun-92
pH			6.2
Temperature	°C		22
Chemical Oxygen Demand	mg/L	STD METH 508	2400
Kjeldahl Nitrogen	mg/L	EPA 351.2	76
Oil & Grease	mg/L	EPA 413	568
Total Organic Carbon	mg/L	EPA 415.1	485
Phosphorus, Total	mg/L	EPA 365.1	1.5
Total Petroleum Hydrocarbons	mg/L	EPA 418.1	177.6
Phenols	µg/L	EPA 420.2	235
Arsenic	µg/L	EPA 206.2	<10
Barium	µg/L	EPA 200.7	<100
Beryllium	µg/L	EPA 210.1	<10
Cadmium	µg/L	EPA 213.2	24
Calcium	mg/L	EPA 215.1	40
Chromium, Total	µg/L	EPA 218.1	55
Copper	µg/L	EPA 220.1	<50
Iron	µg/L	EPA 236.1	5400
Lead	µg/L	EPA 239.2	218
Magnesium	mg/L	EPA 242.1	11
Manganese	µg/L	EPA 243.1	79
Mercury	µg/L	EPA 245.1	<1
Nickel	µg/L	EPA 249.1	61
Silver	µg/L	EPA 272.2	14
Zinc	µg/L	EPA 200.7	810
Residue, Total	mg/L	EPA 160.3	850
Residue, Filterable	mg/L	EPA 160.1	454
Residue, Nonfilterable	mg/L	EPA 160.2	28
Residue, Volatile	mg/L	EPA 160.4	687
Specific Conductance	µmhos	EPA 120.1	770
Surfactants-MBAS	mg/L	EPA 425.1	3.8

Appendix B

601/602 Data

Table B-1. Lagoon Results 601/602
Lagoon 24-hour results
Mountain Home AFB Wastewater Characterization Survey
1-12 June

			GN921229	GN921231	GN921235	GN921239	GN921245
			Lagoon	Lagoon	Lagoon	Lagoon	Lagoon
Analyte	Units	Method	07-Jun-92	08-Jun-92	09-Jun-92	10-Jun-92	11-Jun-92
Bromodichloromethane	µg/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4
Bromoform	µg/L	EPA 601	<0.7	<0.7	<0.7	<0.7	<0.7
Carbon tetrachloride	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	µg/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3
Chloroethane	µg/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9
Chloroform	µg/L	EPA 601	<0.3	<0.3	<0.3	0.59	0.6
Chloromethane	µg/L	EPA 601	<0.8	<0.8	<0.8	<0.8	<0.8
Chlorodibromomethane	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	EPA 601	4.3	3.3	<0.5	<0.5	<0.5
Dichlorodifluoromethane	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4
1,2-Dichloroethane	µg/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3
1,1-Dichloroethene	µg/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3
trans-1,2-Dichloroethene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,3-Dichloropropene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropen	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	µg/L	EPA 601	<0.4	<0.4	2.2	<0.4	<0.4
1,1,2,2-Tetrachloroethan	µg/L	EPA 601	<0.2	<0.2	<0.2	<0.2	<0.2
Tetrachloroethylene	µg/L	EPA 601	<0.6	<0.6	<0.6	<0.6	<0.6
1,1,1-Trichloroethane	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	EPA 601	<0.2	<0.2	<0.2	<0.2	<0.2
Trichloroethylene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4
Vinyl chloride	µg/L	EPA 601	<0.2	<0.2	<0.2	<0.2	<0.2
Bromomethane	µg/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9
2-Chloroethylvinyl ether	µg/L	EPA 601	<0.2	<0.2	<0.2	<0.2	<0.2
1,3-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	EPA 602	2.5	3.1	<0.5	<0.5	<0.5
Ethyl benzene	µg/L	EPA 602	0.83	0.83	<0.6	<0.6	<0.6
Chlorobenzene	µg/L	EPA 602	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene	µg/L	EPA 602	6.2	3.4	6.6	5.9	4.05
Benzene	µg/L	EPA 602	0.56	0.56	<0.3	<0.3	<0.3
1,2-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5	<0.5	<0.5	<0.5

* Note Shaded areas indicate detectable parameters

Table B-2. Lagoon # Results 601/602
Lagoon # 6-8 hour results
Mountain Home AFB Wastewater Characterization Survey
1-12 June

			GN921209	GN921211	GN921213	GN921221	GN921223	GN921225	GN921233
			Lagoon 2	Lagoon 3	Lagoon 4	Lagoon 5	Lagoon 6	Lagoon 7	Lagoon 8
Analyte	Units	Method	04-Jun-92	04-Jun-92	05-Jun-92	05-Jun-92	05-Jun-92	06-Jun-92	08-Jun-92
Bromodichloromethane	µg/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromoform	µg/L	EPA 601	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Carbon tetrachloride	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	µg/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloroethane	µg/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Chloroform	µg/L	EPA 601	2.4	1.2	0.55	1.2	2.56	<0.3	4.1
Chloromethane	µg/L	EPA 601	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Chlorodibromomethane	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,2-Dichloroethane	µg/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,1-Dichloroethene	µg/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
trans-1,2-Dichloroethene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	EPA 601	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,3-Dichloropropene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropen	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	µg/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,1,2,2-Tetrachloroethan	µg/L	EPA 601	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Tetrachloroethylene	µg/L	EPA 601	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
1,1,1-Trichloroethane	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	EPA 601	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Trichloroethylene	µg/L	EPA 601	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L	EPA 601	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Vinyl chloride	µg/L	EPA 601	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromomethane	µg/L	EPA 601	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
2-Chloroethylvinyl ether	µg/L	EPA 601	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,3-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl benzene	µg/L	EPA 602	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Chlorobenzene	µg/L	EPA 602	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene	µg/L	EPA 602	1.8	1.9	1.1	2.9	1.9	0.82	41
Benzene	µg/L	EPA 602	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
1,2-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

* Note: Shaded areas indicate detectable parameters

Table B-3. CE Pump Results 601/602 CE Pump Station Results Mountain Home AFB Wastewater Characterization Survey 1-12 June				
			GN921217	GN921241
			CE Pump	CE Pump
Analyte	Units	Method	05-Jun-92	10-Jun-92
Bromodichloromethane	µg/L	EPA 601	<0.4	<0.4
Bromoform	µg/L	EPA 601	<0.7	<0.7
Carbon tetrachloride	µg/L	EPA 601	<0.5	<0.5
Chlorobenzene	µg/L	EPA 601	<0.3	<0.3
Chloroethane	µg/L	EPA 601	<0.9	<0.9
Chloroform	µg/L	EPA 601	<0.3	<0.3
Chloromethane	µg/L	EPA 601	<0.8	<0.8
Chlorodibromomethane	µg/L	EPA 601	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5
1,3-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5
Dichlorodifluoromethane	µg/L	EPA 601	<0.5	<0.5
1,1-Dichloroethane	µg/L	EPA 601	<0.4	<0.4
1,2-Dichloroethane	µg/L	EPA 601	<0.3	<0.3
1,1-Dichloroethene	µg/L	EPA 601	<0.3	<0.3
trans-1,2-Dichloroethene	µg/L	EPA 601	<0.5	<0.5
1,2-Dichloropropane	µg/L	EPA 601	<0.3	<0.3
cis-1,3-Dichloropropene	µg/L	EPA 601	<0.5	<0.5
trans-1,3-Dichloropropen	µg/L	EPA 601	<0.5	<0.5
Methylene chloride	µg/L	EPA 601	<0.4	<0.4
1,1,2,2-Tetrachloroethan	µg/L	EPA 601	<0.2	<0.2
Tetrachloroethylene	µg/L	EPA 601	<0.6	<0.6
1,1,1-Trichloroethane	µg/L	EPA 601	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	EPA 601	<0.2	<0.2
Trichloroethylene	µg/L	EPA 601	<0.5	<0.5
Trichlorofluoromethane	µg/L	EPA 601	<0.4	<0.4
Vinyl chloride	µg/L	EPA 601	<0.2	<0.2
Bromomethane	µg/L	EPA 601	<0.9	<0.9
2-Chloroethylvinyl ether	µg/L	EPA 601	<0.2	<0.2
1,3-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5
Ethyl benzene	µg/L	EPA 602	<0.6	<0.6
Chlorobenzene	µg/L	EPA 602	<0.3	<0.3
Toluene	µg/L	EPA 602	17	8.7
Benzene	µg/L	EPA 602	<0.3	<0.3
1,2-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5

*** Note: Shaded areas indicate dectectable parameters**

Table B-4. Motel Pump Results 601/602
Motel Pump Station Results
Mountain Home AFB Wastewater Characterization Survey
1-12 June

			GN921219	GN921237
			Motel	Motel
Analyte	Units	Method	05-Jun-92	09-Jun-92
Bromodichloromethane	µg/L	EPA 601	<0.4	<0.4
Bromoform	µg/L	EPA 601	<0.7	<0.7
Carbon tetrachloride	µg/L	EPA 601	<0.5	<0.5
Chlorobenzene	µg/L	EPA 601	<0.3	<0.3
Chloroethane	µg/L	EPA 601	<0.9	<0.9
Chloroform	µg/L	EPA 601	1.6	0.58
Chloromethane	µg/L	EPA 601	<0.8	<0.8
Chlorodibromomethane	µg/L	EPA 601	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5
1,3-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	EPA 601	<0.5	<0.5
Dichlorodifluoromethane	µg/L	EPA 601	<0.5	<0.5
1,1-Dichloroethane	µg/L	EPA 601	<0.4	<0.4
1,2-Dichloroethane	µg/L	EPA 601	<0.3	<0.3
1,1-Dichloroethene	µg/L	EPA 601	<0.3	<0.3
trans-1,2-Dichloroethene	µg/L	EPA 601	<0.5	<0.5
1,2-Dichloropropane	µg/L	EPA 601	<0.3	<0.3
cis-1,3-Dichloropropene	µg/L	EPA 601	<0.5	<0.5
trans-1,3-Dichloropropen	µg/L	EPA 601	<0.5	<0.5
Methylene chloride	µg/L	EPA 601	<0.4	<0.4
1,1,2,2-Tetrachloroethan	µg/L	EPA 601	<0.2	<0.2
Tetrachloroethylene	µg/L	EPA 601	<0.6	<0.6
1,1,1-Trichloroethane	µg/L	EPA 601	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	EPA 601	<0.2	<0.2
Trichloroethylene	µg/L	EPA 601	<0.5	<0.5
Trichlorofluoromethane	µg/L	EPA 601	<0.4	<0.4
Vinyl chloride	µg/L	EPA 601	<0.2	<0.2
Bromomethane	µg/L	EPA 601	<0.9	<0.9
2-Chloroethylvinyl ether	µg/L	EPA 601	<0.2	<0.2
1,3-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5
Ethyl benzene	µg/L	EPA 602	<0.6	<0.6
Chlorobenzene	µg/L	EPA 602	<0.3	<0.3
Toluene	µg/L	EPA 602	4.9	13.9
Benzene	µg/L	EPA 602	<0.3	<0.3
1,2-Dichlorobenzene	µg/L	EPA 602	<0.5	<0.5

*** Note: Shaded areas indicate detectable parameters**

Table B-5. Propulsion Results 601/602
Propulsion Results
Mountain Home AFB Wastewater Characterization Survey
1-12 June

			GN921243
			Propulsion
Analyte	Units	Method	10-Jun-92
Bromodichloromethane	µg/L	EPA 601	<0.4
Bromoform	µg/L	EPA 601	<0.7
Carbon tetrachloride	µg/L	EPA 601	<0.5
Chlorobenzene	µg/L	EPA 601	<0.3
Chloroethane	µg/L	EPA 601	<0.9
Chloroform	µg/L	EPA 601	9.7
Chloromethane	µg/L	EPA 601	<0.8
Chlorodibromomethane	µg/L	EPA 601	<0.5
1,2-Dichlorobenzene	µg/L	EPA 601	<0.5
1,3-Dichlorobenzene	µg/L	EPA 601	<0.5
1,4-Dichlorobenzene	µg/L	EPA 601	<0.5
Dichlorodifluoromethane	µg/L	EPA 601	<0.5
1,1-Dichloroethane	µg/L	EPA 601	<0.4
1,2-Dichloroethane	µg/L	EPA 601	<0.3
1,1-Dichloroethene	µg/L	EPA 601	<0.3
trans-1,2-Dichloroethene	µg/L	EPA 601	<0.5
1,2-Dichloropropane	µg/L	EPA 601	<0.3
cis-1,3-Dichloropropene	µg/L	EPA 601	<0.5
trans-1,3-Dichloropropen	µg/L	EPA 601	<0.5
Methylene chloride	µg/L	EPA 601	28.4
1,1,2,2-Tetrachloroethan	µg/L	EPA 601	<0.2
Tetrachloroethylene	µg/L	EPA 601	<0.6
1,1,1-Trichloroethane	µg/L	EPA 601	<0.5
1,1,2-Trichloroethane	µg/L	EPA 601	<0.2
Trichloroethylene	µg/L	EPA 601	<0.5
Trichlorofluoromethane	µg/L	EPA 601	<0.4
Vinyl chloride	µg/L	EPA 601	<0.2
Bromomethane	µg/L	EPA 601	<0.9
2-Chloroethylvinyl ether	µg/L	EPA 601	<0.2
1,3-Dichlorobenzene	µg/L	EPA 602	<0.5
1,4-Dichlorobenzene	µg/L	EPA 602	<0.5
Ethyl benzene	µg/L	EPA 602	16.3
Chlorobenzene	µg/L	EPA 602	<0.3
Toluene	µg/L	EPA 602	105.7
Benzene	µg/L	EPA 602	3.3
1,2-Dichlorobenzene	µg/L	EPA 602	<0.5

*** Note: Shaded areas indicate detectable parameters**

Appendix C

Biochemical Oxygen Demand (BOD-5) Data

Table C-1. Biochemical Oxygen Demand for the Lagoon Sampling Site in mg/L

Mountain Home AFB Wastewater Characterization Survey

1-12 June

	Lagoon 1	Lagoon 2	Lagoon 3	Lagoon 4	Lagoon 5	Lagoon 6	Lagoon 7	Lagoon 8	Lagoon	Lagoon	Lagoon	Lagoon
	04-Jun-92	04-Jun-92	04-Jun-92	04-Jun-92	05-Jun-92	05-Jun-92	06-Jun-92	08-Jun-92	05-Jun-92	06-Jun-92	07-Jun-92	08-Jun-92
4 ml of sample												
Beginning Oxygen	7	7.1	7.2	7	7.2	7.2	7.2	6.9	7.2	7.2	7.1	7
Run 1, 5 Day	4.5	4.8	5	4.4	4.3	4.7	5.4	5.8	4.5	5	5.8	5.2
Run 2, 5 Day	4	5.2	4.5	4.9	4.4	5	5.4	5.8	4.7	5.2	5.6	5.2
Run 3, 5 Day	4.2	5.2	5	4.8	4.4	5	5.4	5.8	4.8	5	5.4	5.2
Consumed Oxygen	2.77	2.03	2.37	2.30	2.83	2.30	*1.80*	*1.10*	2.53	2.13	*1.50*	*1.80*
BOD-5	208	153	177	173	212	173	135	82	190	160	113	135
7 ml of sample												
Beginning Oxygen	7.1	7.1	7	7.1	7.2	7.2	7	6.9	7.1	7	7.1	7
Run 4, 5 Day	2.7	3.1	3.6	3.6	2.8	3.6	4	4.4	3.4	3.6	4.7	4.2
Run 5, 5 Day	2.6	3.1	3.5	3.9	2.7	3.6	4.2	4.4	3.8	3.6	4.4	4.4
Run 6, 5 Day	2.6	2.6	3.4	4	2.6	3.7	4.1	4.8	3.9	3.9	4.6	4.4
Consumed Oxygen	4.47	4.17	3.50	3.27	4.50	3.57	2.90	2.37	3.40	3.30	2.53	2.67
BOD-5	191	179	150	140	193	153	124	101	146	141	109	114
BOD-5 Avg	199	166	164	156	203	163	124	101	168	151	109	114
Run 1, BOD-5	188	173	165	195	217	188			203	165		
Run 2, BOD-5	225	143	203	158	210	165			188	150		
Run 3, BOD-5	210	143	165	165	210	165			180	165		
Run 4, BOD-5	189	171	146	150	189	154	129	107	159	146	103	120
Run 5, BOD-5	193	171	150	137	193	154	120	107	141	146	116	111
Run 6, BOD-5	193	193	154	133	197	150	124	90	137	133	107	111

Note: Shaded areas indicate that the oxygen uptake was less than 2.0 mg/L and cannot be used for calculations

Table C-2. QA/QC for Biochemical Oxygen Demand in mg/L

	04-Jun-92	05-Jun-92	05-Jun-92	06-Jun-92	06-Jun-92	07-Jun-92	07-Jun-92	08-Jun-92	08-Jun-92
	Blank	Blank	Glucose	Blank	Glucose	Blank	Glucose	Blank	Glucose
Beginning Oxygen	7.2	7.4	7.6	7.4	7.2	7.2	7.2	7.1	7
Ending Oxygen	7.2	7.4	0	7.2	0	7.4	0	7.3	0

Appendix D

Quality Assurance/Quality Control Data

Table D-1. BEE Shop QA/QC Data
QA/QC Samples at the BEE Shop
Mountain Home AFB Wastewater Characterization Survey
1-12 June 1992

			GN921246	GN921248	GN921250	Certified	Advisory		Spike
			Blank	Spike	Spike	Value	Range		Value
Analyte	Units	Method	10-Jun-92	10-Jun-92	10-Jun-92				
Phosphorus, Total	mg/L	EPA 365.1	<0.1	4.3	4.6	8.2	7	9.4	Low
Phenols	µg/L	EPA 420.2	<10	70	66	67	51	83	OK
Arsenic	µg/L	EPA 206.2	<10	100	114	70.9	55.7	78.7	High
Barium	µg/L	EPA 200.7	<100	120	<100	113	92.7	133	OK
Beryllium	µg/L	EPA 210.1	<10	90	85	108	97	119	Low
Cadmium	µg/L	EPA 213.2	<5	158	145	141	127	156	OK
Calcium	mg/L	EPA 215.1	<1	<1.0	<1.0				
Chromium, Total	µg/L	EPA 218.1	<50	96	90	91.8	75.6	105	OK
Copper	µg/L	EPA 220.1	<50	96	88	108	97.1	118	Low
Iron	µg/L	EPA 236.1	<100	230	210	244	216	270	OK
Lead	µg/L	EPA 239.2	<20	100	100	102	88.5	117	OK
Magnesium	mg/L	EPA 242.1	<1.0	<1.0	<1.0				
Manganese	µg/L	EPA 243.1	<50	160	150	150	137	162	OK
Mercury	µg/L	EPA 245.1	<50	1.14	1.21	5.05	3.54	6.02	Low
Nickel	µg/L	EPA 249.1	<1	160	150	157	139	175	OK
Silver	µg/L	EPA 272.2	8	6	56	92.6	77	107	Low
Zinc	µg/L	EPA 200.7	<50	240	220	236	210	257	OK
Residue, Total	mg/L	EPA 160.3	18						
Residue, Filterable	mg/L	EPA 160.1	2						
Residue, Nonfilterable	mg/L	EPA 160.2	10						
Residue, Volatile	mg/L	EPA 160.4	6						
Specific Conductance	µmhos	EPA 120.1	2.2						
Surfactants-MBAS	mg/L	EPA 425.1	<0.1						

Note Blank cells indicate no sample was analyzed for that specific analyte

Appendix E

WasteWatR^{TM} Information

ENVIRONMENTAL RESOURCE ASSOCIATES
Arvada, Colorado 80002 1-800-ERA-0122

Instructions for the use of

WasteWatR™ Quality Control Standards

Caution: Read instructions carefully before opening **WasteWatR™** standards.

I. Standard Preparation

A. The MINERALS, HARDNESS and GREASE & OIL Quality Control Standards have been prepared as whole volume samples for use full strength without dilution.

B. DEMAND, NUTRIENTS, CYANIDE & PHENOL, RESIDUAL CHLORINE and TRACE METALS standards are concentrates and must be diluted by the following directions before analysis. Only the diluted concentrates are to be considered as sample, not the concentrates themselves. Approximately 11 ml of each concentrate is supplied so that two dilutions of each standard can be prepared. Approximately 2.5 ml of RESIDUAL CHLORINE concentrate is provided.

1. TRACE METALS concentrate. Volumetrically pipet (with a clean, dry pipet) 5.0 ml of concentrate into a 500 ml volumetric flask; add nitric acid to preserve and dilute to the mark with reagent water. **No separate dilution is required for silver.**
2. DEMAND, NUTRIENTS and CYANIDE & PHENOL concentrates. Volumetrically pipet (with a clean, dry pipet) 5.0 ml of concentrate into a 1 liter volumetric flask; dilute to the mark with reagent water. Prepare and analyze each concentrate independently of the others. If you desire other concentrations, dilute the concentrates proportionately and multiply the approximate, certified values and advisory range of values by the appropriate factor.
3. RESIDUAL CHLORINE concentrate. Volumetrically pipet 1.0 ml into a 1 liter volumetric flask; dilute to the mark with reagent water that has been verified to be free of organics. Analyze immediately upon dilution.

C. The stability and certified values are unconditionally guaranteed for one year. Due to possible sample contamination the guarantee is void after the samples are opened.

II. Standard Storage

A. MINERALS, HARDNESS and GREASE & OIL standards should be stored at or below 25°C.

B. DEMAND, NUTRIENTS, CYANIDE & PHENOL, RESIDUAL CHLORINE and TRACE METALS standards have been prepared in concentrated form to increase their stability. Concentrates should be stored at or below 25°C in the dark. However, the preservative treatment is rendered ineffective once the concentrates are opened and diluted. Therefore, the **WasteWatR™** standards supplied in concentrate form must be analyzed as soon as possible after the concentrates are opened and diluted.

III. Standard Analysis

Remember... **ERA WasteWatR™** standards are a tool to help you evaluate the accuracy of your wastewater data. Therefore, **ERA WasteWatR™** standards should be analyzed as part of a routine sample load by your regular methods including all preparation or digestion steps. A list of "Approximate Concentrations" for **ERA WasteWatR™** standards is on the reverse side to assist the analyst in choosing an appropriate aliquot for analysis.

A. MINERALS and HARDNESS standards must be well shaken for 5 seconds before removing every aliquot for analysis. Be careful to correct for pH, color and turbidity effects in each analysis. If there are any visible clumps in the samples, homogenize before analysis. The alkalinity is titrated to pH4.5. Alkalinity and pH should be analyzed immediately upon opening the MINERALS standard.

B. **Transfer the whole GREASE & OIL standard to a** separatory funnel. Carefully rinse the sample bottle with solvent, add the solvent washings to the funnel and extract the sample well. The certified value of GREASE & OIL is given as mg per bottle to avoid confusion due to the sample volume being less than 1 liter. Great care must be taken in the extraction, separation and drying steps to avoid determining results that are too low. **Certified values are given for both gravimetric and infrared methods of analysis.**

C. DEMAND standard must be seeded with a biologically active seed material when determining BOD. Be sure to determine the BOD of the seed material so that a proper seed correction can be made. See "Standard Methods for the Examination of Water and Wastewater" for complete details. Commonly, a laboratory will determine the correct values for COD and TOC but be low for BOD. If this happens, check the quality of the seed. Note that phosphorus and Kjeldahl nitrogren are analyzed out of the DEMAND standard. Both parameters are present as organic compounds which will test the adequacy of your digestion methods.

D. NUTRIENTS standard contains common interferences which will really test your methods. Be sure to check for pH before sample analysis.

E. CYANIDE & PHENOL standard is prepared using free and complex cyanide. An inadequate sample digestion will cause cyanide results to be significantly low. Check the sample pH before performing the phenol distillation, **and acidify only under a fume hood.**

F. TRACE METALS standard is prepared so that the analyses can be completed by ICP or atomic absorption. If low recoveries are obtained when using GFAA, ERA recommends the use of standard additions.

G. RESIDUAL CHLORINE standard must be prepared in organic-free water. If you use a "kit" for analysis, typically your results will be too low. Check your reagents or change methods.

IV. Certified Results

The ERA certified and advisory range of values are included. The advisory range is the range of values that an experienced laboratory can expect to attain using the most precise methods and equipment. In determining its advisory ranges, ERA considers both the parameter and the most commonly used method of analysis for the parameter. Whenever available the advisory range is based on EPA data collected during method or performance evaluation studies. **ERA stresses that it is the responsibility of the individual laboratory to determine acceptable levels of performance for a particular analytical result depending on the intended use of the data.**

V. Safety

ERA products may be hazardous and are intended for use by professional laboratory personnel trained in the competent handling of such materials. Responsibility for the safe use of these products rests entirely with the buyer and/or user. If you need a Material Safety Data Sheet for any ERA product, please call toll-free at 1-800-ERA-0122.

Approximate Concentrations of

WasteWatR™ Quality Control Standards

These concentration ranges are given to assist the analyst in choosing the appropriate sample aliquot size for analysis.

Parameter	Approximate Concentration mg/l
MINERALS	
total solids at 105°C	500-2000
dissolved solids at 180°C	500-2000
conductivity	500-2500 micromhos
alkalinity as $CaCO_3$	100-300
chloride	50-400
fluoride	1-20
sulfate	50-400
potassium	50-300
sodium	50-300
pH	6-10 units
HARDNESS	
suspended solids at 105°C	10-120
calcium	50-150
magnesium	5-50
hardness as $CaCO_3$	50-500
GREASE & OIL(1)	10-100 mg/bottle
DEMAND	
BOD	20-300
COD	40-400
TOC	10-100
total phosphorus as P	1-10
Kjeldahl nitrogen as N	1-20
NUTRIENTS	
ammonia as N	1-20
nitrate plus nitrite as N	1-20
phosphate as P	1-10
CYANIDE	0.025-0.5
& PHENOL	0.025-0.5
TRACE METALS	
antimony, arsenic, beryllium, cadmium, selenium, silver, & thalium	0.01-0.25
mercury	0.001-0.02
aluminum, barium, boron, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, strontium, vanadium & zinc	0.05-1.0
RESIDUAL CHLORINE	0.5-3.0

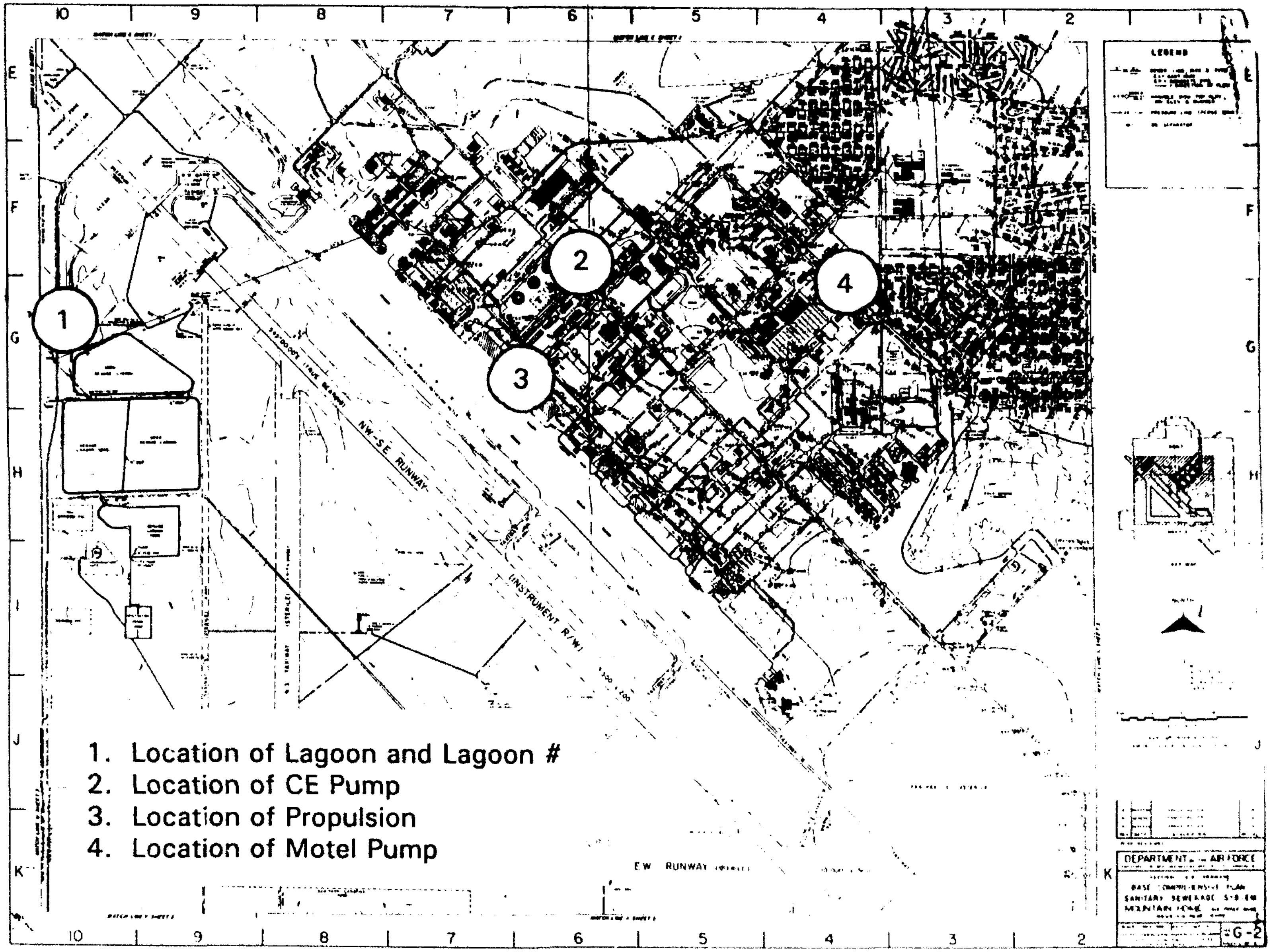
(1)Method References:

a. Gravimetric: 413.1, Separatory Funnel Extraction (EPA 600/4-79-020)
b. Infrared: 413.2 (EPA 600/4-79-020)
c. The oil used in ERA Grease & Oil standards absorbs infrared light more intensely than the reference oil used in 413.2; therefore, the infrared certified values will be approximately 35% higher than those for the gravimetric method.

Appendix F

Maps

Table F-1. Locations of Sampling Sites



Appendix G

Pump Data

TABLE G-1 LAGOON PUMP NUMBERS			
Pump	1	2	3
04-Jun-92	19499.0	22998.4	19666.8
05-Jun-92	19500.2	22999.5	19679.4
06-Jun-92	19500.5	22999.8	19692.4
07-Jun-92	19502.3	23001.5	19696.4
08-Jun-92	19504.7	23004.0	19698.5
09-Jun-92	19508.2	23007.2	19707.1
10-Jun-92	19512.7	23012.3	19712.5

Note: The number for 4-Jun-92 was taken at 0845 and would be the baseline number

Note: These numbers typically represent running time in hours

TABLE G-2 LAGOON # PUMP NUMBERS			
Pump	1	2	3
Lagoon 1	19499.0	22998.4	19666.8
Lagoon 2	*	*	*
Lagoon 3	19499.2	22998.5	19675.6
Lagoon 4	19500.2	22999.5	19679.4
Lagoon 5	19500.3	22999.6	19684.1
Lagoon 6	19500.4	22999.6	19687.9
Lagoon 7	19500.5	22999.8	19692.4
Lagoon 8	19505.8	23004.9	19700.5

Note: The number for Lagoon 1 was taken at 0845 and would be the baseline number

Note: These numbers typically represent running time in hours

* No reading was possible for Lagoon 2, no key to bldg.